

FOSSIL POLYPLACOPHORA FROM EOCENE BEDS
OF MUDDY CREEK, MORNINGTON (SCHNAPPER
POINT) AND MOORABOOL, VICTORIA, WITH
DEFINITIONS OF NINE NEW SPECIES, AND
NOTES ON OTHERS.

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PLATE IV.

The very valuable collection of Fossil Polyplacophora dealt with in this paper has been placed in our hands for description by the late Professor Ralph Tate, to whom belongs the honor of having brought together such an interesting series, the major part having been collected by himself and Mr. J. Dennant, of Victoria. One very interesting feature of this collection is the close affinity so many bear to living forms. The collection numbers in all 32 valves, comprising 17 or 18 species, and representing seven different genera. The whole collection is deposited in the University Museum, Adelaide.

1. *Lorica compressa*, *n. sp.* Pl. iv., fig. 6.

One example of median valve.

General Appearance.—Strongly carinated, side slope straight, color yellowish to dark-brown. The valves are produced forward in an anterior beak.

Lateral Area.—Much raised, ornamented with five, increasing to eight, at the insertion plates, granulose ridges. The granules near the girdle are arranged in transverse rows.

Pleural Area.—This area is longitudinally ribbed with 16 strong ridges, the interspaces are deep, the anterior portion is about the same width as the ridges, the posterior portion about double the width. There is a suggestion that the ridges were crossed by shallow transverse ridging.

Dorsal Area.—This area is not separated from the pleural, the longitudinal ridging being continued right over the jugum.

Measurement.—Greatest width between the slopes, 24 mm.; greatest width of slopes, 11 mm.; greatest length of slope, 18 mm. The longitudinal measurement of the dorsal area is 12 mm.; divergence, 85°. The insertion plates and sutural laminae are missing.

Remarks.—This species differs from *Lorica volvox* and *L. affinis* in the strong radial ribbing of the lateral areas and the great number of the longitudinal ribs in the pleural area, but it corresponds with *L. affinis* in the compression of the side slopes. The decussation of the interspaces present in *L. affinis* is absent in this species.

2. *Lorica affinis*, n. sp. Pl. iv., fig. 7.

One example of median valve.

General Appearance.—Carinated, side slope slightly curved, though almost straight, color pale yellowish-brown.

Lateral Area.—Distinctly raised, ornamented with six radial rows of somewhat distant pustules which rise out of very shallow ridges.

Pleural Area.—Longitudinally ribbed with twelve narrow, but strong ridges; the interspaces are fully three times the width of the ribs, and nearly flat; these ridges have a slight tendency to granulation, but the transverse striae which produce the same appearance in its congener, *Lorica volvox*, are not discernible in this species. The megalopores are very pronounced, giving under a powerful lense a strongly decussated appearance.

Measurement.—The greatest width between the slopes is 20 mm.; width of slopes, 10 mm.; length of slopes, 15 mm.; divergence, 90°.

Insertion plates have broken away; there is no indication of teeth.

Remarks.—This species so closely resembles *Lorica volvox*, Reeve, that it almost justifies its being referred to that living species; the most marked difference is in the compression of the valves. In *volvox* there is a slight widening or separating of the two slopes at their extremities, whereas in the species now described there is a slight drawing together. The other differences are the absence of transverse striae (but this may be accounted for through the wearing of the shell) and the more decussated effect produced by the megalopores. Its close affinity to *Lorica volvox*, Reeve, is undoubted.

3. *Loricella gigantea*, n. sp. Pl. iv., fig. 3.

One specimen of anterior valve only.

General Appearance.—Color dirty-white or wainscot-brown, shape exceptionally broad (nearly twice as broad as long) and very flat, anterior third of valve curved downwards, other two-thirds practically straight except at the apex, which is very slightly elevated.

Sculpture.—Radially ribbed with very numerous, pronounced, bifurcating riblets, which are crossed by about 26 concentric wrinkles; while these are clearly defined, some are more so than

others. These wrinkles break up the riblets into more or less pronounced granules. The eves only slightly overhang. Slits 18, at irregular distances. Margins of teeth are irregular, more crenulate than pectinate. The strong pectination of its congener, *Loricella Angasi*, Ad. and Ang., is quite absent, but the teeth are deeply grooved to their bases, very little indication of this being present in the living form. In *L. Angasi* a deep groove runs from each slit to the apex. In the fossil under review there is no groove, but its place is occupied by a slightly raised rib.

Inside of Shell (Articulamentum).—The valve, except where stained, is paler than the tegmentum, a rib running from each of the slits to the apex, except that from the posterior slit, which is almost parallel with the posterior margin of valve.

Measurement.—Length, 16 mm.; breadth, 33 mm.; elevation, $7\frac{1}{2}$ mm.

Locality.—Mornington.

Remarks.—As compared with *Loricella Angasi*, the valve is much flatter, is convex instead of concave. The coarse radial ribs, nine or more in number, present in *L. Angasi*, are entirely absent, the riblets being evenly distributed over the whole valve. The largest specimen of *L. Angasi* known to us measures 68 mm. by 44 mm. This valve is fully one-fourth larger than the anterior valve of that specimen, and therefore we may conclude that when living this ancient form would have measured fully 85 mm. by 55 mm.

4. *Plaxiphora concentrica*, n. sp. Pl. iv., fig. 8.

One example of posterior valve only.

General Appearance.—Broad, rounded. Color pale-brown, slightly olivaceous. The tegmentum is posteriorly bent over, and continued for some distance on the underside of shell. Mucro evidently postmedian, though much worn. The anterior portion of shell well preserved, showing six strong concentric ribs, each following closely the contour of the margin of the shell. There are evidences that these ribs were continued without any break right round the posterior margin, though the ribbing in this part of shell is less strong, and the ribs are closer together. No other sculpture is discernible on the tegmentum. Insertion plates unslit in the posterior valve.

Measurement.—Posterior valve, total width 17 mm., total length, 10 mm.; width of tegmentum only, 15 mm.; length of tegmentum only, 7 mm.

Inside.—Articulamentum white, sinus 4 mm. wide at apex, 8 mm. at widest part. Sutural laminae produced beyond the tegmentum, $4\frac{1}{2}$ mm. The sutural laminae and insertion plates are remarkably posteriorly thickened. The two dorsal pits and lateral grooves are very deep.

Remarks.—This shell is allied to the living forms *Plaxiphora petholata*, Sby, and *P. glauca*, Q. and G., rather more so to the latter than to the former. It is more strongly concentrically ribbed, more evenly rounded, sinus narrower, sutural laminae twice the length, the anterior margin of tegmentum slightly produced forward in the centre of the sinus, and the inside is white instead of greenish-blue. The microscopic vermiculate wrinkling is quite absent in the specimen under description.

5. *Plaxiphora gellibrandi*, *n. sp.* Pl. iv., fig. 1.

One example of posterior valve.

General Appearance.—Broad, flat, jugum slightly raised, side slope nearly straight. Color blackish, with irregular streaks of green. A pale broad wedge-shaped mark on dorsal ridge.

Mucro.—Post median, slightly raised.

Dorsal Area.—Slightly raised and ornamented with a broad whitish wedge-shape mark. A shallow curved diagonal rib runs from the mucro forward, keeping near the margin of valve. The whole of the valve is ornamented with the same peculiar sculpture that is present in *Plaxiphora petholata*, Sby., and which Sowerby in his description describes as a microscopic pattern resembling a dense punctulation, united with a minute zigzag or vermiculate wrinkling.

Measurement.—Posterior valve, total width 14 mm., total length 8 mm.; width of tegmentum only, 11 mm.; length of tegmentum only, 5 mm.

Inside.—Articulamentum white, sinus 3 mm. at apex, increasing to 6 mm.; sutural laminae produced beyond tegmentum 3 mm.

The eyes are shallow and spongy. The articulamentum of insertion plates and sutural laminae is greatly thickened. The two dorsal pits and corresponding lateral grooves are very deep.

Locality.—Eocene beds, Gellibrand, Victoria.

Remarks.—This species very closely resembles *P. petholata*, Sby. The inside pits and lateral grooves are deeper, and the inside color white instead of greenish blue. The shell is also broader, and the anterior margin of tegmentum is slightly produced forward.

6. *Acanthochites (Notoplax) granulosus*, *n. sp.* Pl. iv., fig. 9.

Two examples of median valves.

General Appearance.—Carinated beaked, side slope straight, except lateral area, which is reflex; color mottled in two shades of green, somewhat bleached.

Dorsal Area.—This area is clearly defined, being broadly wedge shape, produced forward in a distinct beak, which is slightly bent downwards. A shallow depression separates this area from the pleural. Sculpture consists of about a score of

longitudinal, closely packed granulose riblets. The granules increase in definition towards the margin of the pleural area, where they will be more correctly described as longitudinal rows of granules.

Pleural Area.—In this area the rows of granules are radial, the rows being separated, widely apart, and very regular. In this area the granules become large, digitate, in some cases pointed, inclined very much forward, the apex of one just reaching to the base of the one in front of it. Where the apex is broken off the pustules are seen to be hollow.

Lateral Area.—Raised or recurved, clearly defined, the pustules being rounded and granulose, becoming crowded and irregularly placed as they approach the posterior margin of valve.

Inside.—The articulamentum was probably white. The insertion plates are well produced, though in the specimens under examination rather broken, and apparently unslit. The upper surface of the sutural laminae is irregularly grooved, sinus broad.

Measurement.—Width of valve, 7 mm.; length of valve, 7 mm.; length of slope, 5 mm.; divergence, 100°.

Locality.—Schnapper Point.

7. *Acanthochites rostratus*, n. sp. Pl. iv., fig. 5.

One median valve.

General Appearance.—Carinated, side slope straight, strongly beaked. Color porcelain white.

Dorsal Area.—Wedge shape, much raised, convex, strongly beaked, the beak bent downwards. This area is smooth and glossy under an ordinary pocket lense, but under a fairly high power it is seen to be pitted with irregular shallow pitting, highly polished.

Lateral and Pleural Areas.—These areas are hardly separable. The shell is a little thickened, and the sculpture a little coarser in the lateral area. The ornamentation consists of a number of somewhat irregular longitudinal rows of finger-shaped flattened pustules. The pustules are set diagonally in the rows, and increase to double the size as they reach the margin of the shell. The posterior margin of valve is bent downwards.

Measurement.—Longitudinally, 3 mm.; breadth, 5 mm.; divergence, 105°.

Inside.—White, insertion plates and sutural laminae not large, sinus broad and shallow, only indicated by a slight sinuosity of outline.

Locality.—Schnapper Point.

8. *Chiton fossicicus*, n. sp. Pl. iv., fig. 4.

One example median valve.

General Appearance.—Valve narrow, carinated, side slopes nearly straight. Color pale olivaceous buff.

Lateral Area.—This area is separated from the pleural area by a much raised, broad, diagonal rib. This rib occupies fully one-half of the area; on the other half are two shallow radial ribs.

Pleural Area.—This area appears to have been sculptured right up to the dorsal ridge, with about 13 sharply chiselled, imbricating longitudinal ribs. The sutures between the ribs are deeply cut, and end as they reach the raised diagonal rib of the lateral area in a very deep pit. So deep are these pits that with the naked eye they appear to be perforations through the tegmentum.

Dorsal Area.—This area is much worn, but, as before stated, there are indications that the ribbing of the pleural area was continued right over this area. The valve is slightly beaked, which is smooth, no striæ being discernible.

Measurement.—Greatest width between the slopes, 10 mm.; greatest width of slope, 4 mm.; length of slope, 7 mm.; divergence, 95°.

Remarks.—Under a strong lense the whole valve, except the beak, is found to be decussated or ornamented with a network of perforations, this being due to the exceptional development of the megalopores. The sutural laminae are much broken away, but the sinus was probably fairly broad and shallow. The insertion plates are quite missing—they have probably broken away. The most striking feature of this shell is the diagonal row of deep pits in the pleural area, and the much elevated broad diagonal rib of the lateral area.

Locality.—Table Cape.

9. *Chiton paucipustulosus*, *n. sp.* Pl. iv., fig. 2.

One medium valve from Table Cape. A well-preserved specimen.

The *Lateral Area* is slightly raised, and contains a number of wavy transverse sulcations, or growth lines, extending into the pleural area. There are 12 to 14 small pustules on the anterior margin of the lateral area.

Pleural Area.—The growth lines are very distinct in this area, and extend across the jugum. There are about 12 short longitudinal imbricating riblets, those nearest the jugum being the longest, and becoming shorter as they approach the centre of slope, those near the centre being mere elongated lumps. From the centre to the girdle they are absent.

Length of dorsal area, 6 mm. Sinus wide, increasing from 2 to 4 mm. The sutural laminae are 3 mm. wide near the sinus, gradually lessening towards the girdle. The pectination of the teeth is fairly distinct.

Measurement.—Width, 25 mm.; length of area, 6 mm.; divergence, 105°.

Remarks.—The shell is glossy olive-green, blotched with olivaceous cuneiform dashes.

10. *Lepidopleurus*, *sp. indet.*

One median valve.

The sculpture in good preservation, although the lateral areas are broken away.

Color.—Creamy white.

Lateral Area.—Raised, ornamented with six regular, radial rows of flattened granules. These are large at the girdle, and gradually diminish towards the jugum.

Pleural Area.—Sculptured with 16 rows of granulose-longitudinal ribs. The interspaces double in width as they approach the anterior margin.

Dorsal Area.—Much worn.

Inside.—The sinus appears to have been wide and shallow. The usual diagonal rib is much raised and rather curved.

Measurement.—The valve is 2 mm. longitudinally, and about $4\frac{1}{2}$ mm. in breadth; divergence, 100° .

11. *Ischnochiton*, *sp. indet.*

Six median valves from Muddy Creek.

The lateral, pleural, and dorsal areas contain a series of 20 to 30 rows of minute triangular pits, converging towards the apex, and having a confluent tendency.

The sinus is about 5 mm. The side slopes are slightly curved. The dorsal area is decidedly beaked, some of the valves being 7 mm. in length; divergence, 95° to 110° .

Remarks.—It is extremely doubtful whether these specimens are referable to the above genus, but without better material it is impossible to be certain.

12. *Chiton*, *sp. indet.*

One valve, very much worn.

The lateral area distinctly raised, with three or four deep sulcations.

The dorsal area is 9 mm, and has a decided beak.

Width of valve, 17 mm.; divergence, 95° .

The side slopes are slightly curved outwards.

A strong costa in the articulation runs up to the dorsal area.

The contour of this valve approaches that of valve two of *Plaxiphora petholata*, Sby.

Locality.—Muddy Creek.

13. *Ischnochiton*, *sp. indet.*

One median valve from Muddy Creek.

The areas are indistinctly marked.

The sutural laminae are half the width of the tegmentum.

Width of valve, 20 mm. The length of the dorsal area is 5 mm.; divergence, 130°.

The generic position of this species is doubtful, but the thinness of the shell and the angle of divergence lead one to conclude that it rightly belongs to the above genus.

14. *Chiton*, *sp. indet.*

Two median valves from Muddy Creek.

Lateral Area.—Distinctly raised, the anterior margin being the most elevated. Three or more deep concentric growth lines cross the area. A very shallow radial ribbing is distinctly present near the girdle, but it disappears as the jugum is approached.

Pleural Area.—This area is ornamented with imbricating longitudinal ribbing. These ribs are strong near the girdle, but become shallower as they approach the jugum. The jugum is much worn.

Measurement.—Width, 8 mm.; length, 4 mm.; divergence, 80°.

15. *Chiton*, *sp. indet.*

One specimen anterior valve.

Slope strongly convex.

Shell polished, the only ornamentation being about 20 shallow concentric ridges.

Inside.—The articulamentum is crossed laterally by a strong ridge. The pectination of what remains of the insertion plate is most pronounced.

16. *Chiton*, *sp. indet.*

One median valve from Muddy Creek.

Lateral Area.—Much broken away, slightly raised, sculptured with strong broken longitudinal ribs.

Pleural Area.—Ornamented with shallow, but distinct longitudinal ribbing, the interspaces being twice the width of the ribs.

Dorsal Area.—Much worn.

Measurement.—Width, 8 mm.; length, 4 mm.; divergence, 95°.

17. *Lorica*, *sp. indet.*

Two median valves from Muddy Creek, both much worn.

Decidedly carinated, side slopes slightly curved.

The *Lateral Areas* are raised, and contain three or four deeply marked radial sulcations, converging at the apex.

The *Pleural Areas* have from eight to ten deep longitudinal ridges, gradually lessening in width towards the girdle.

The *Dorsal Areas* are too much worn to admit of description.

Length of Dorsal Area.—One valve 11 mm., the other 8 mm.; width, 23 mm. and 20 mm. respectively; divergence, 90° and 95°.

The interior of the large valve has a decided internal costa running transversely, and a folded pleat in the posterior margin. The shell bears a striking relationship to the modern *Lorica volvox* of Reeve.

18. *Acanthochiton*, *sp. indet.*

One median valve.

Latero-pleural Area covered with triangular elongated, flattened pustules.

The *Lateral Area* is slightly raised.

The insertion plates are large, being more than half the width of the latero-pleural area.

The *Dorsal Area* is broad wedge shape, but very much worn.

Measurement.—Width, 8 mm.; length, 5 mm.; divergence, 130°.

Remarks.—This specimen bears a strong resemblance to *A. crocodilus*, Torr and Ashby.

Locality.—Muddy Creek.

19.

Five valves from Muddy Creek, and one valve from Schnapper Point, all very worn.

